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PATENT SPECIFICATION

DRAWINGS ATTACHED

1.138.055

Inventor: LEONARD ERNEST STAPLEFORD

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Int. Cl.:—B 41 f 7/26

COMPLETE SPECIFICATION

Improvements in Rotary Offset Printing Units

We, BAKER PERKINS LIMITED, a British Company, of Westwood Works, Peterborough, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to improvements in rotary web offset printing units.

A simple conventional rotary web offset printing unit comprises separate damping and inking rollers which directly transfer damping solution and ink respectively to a printing cylinder, which in turn transfers an ink image to an offset cylinder, otherwise known as a blanket cylinder, and the latter transfers the ink image to a web of material passing through a "nip" between the blanket cylinder and an impression cylinder. More complex printing units may comprise several printing and/or blanket cylinders with or without an impression cylinder.

To avoid smears in the printed image on the web due to the damping system being seriously contaminated by ink, it is necessary for a particular surface area of the printing cylinder firstly to receive damping solution and then ink before transfer of the ink image to the blanket cylinder. Hence, in known printing units the direction of movement of a web through a printing unit cannot be reversed by simple reversal of the direction of rotation of the several cylinders since this would entail ink being applied to the printing cylinder prior to the damping solution with resultant probability of contamination of the damping solution with ink.

An object of this invention is to provide a printing unit which is reversible in operation without the above disadvantage.

In accordance with this invention, a reversible rotary web offset printing unit comprises a printing cylinder, a blanket cylinder having direct peripheral engagement with the printing cylinder, inking means for applying ink

to the printing cylinder, and damping means operative to apply damping solution to the printing cylinder prior to the application of ink, characterised in that the damping means is movable between a first position of direct engagement with the printing cylinder in a first direction of running of the cylinders and a second position of engagement with the blanket cylinder subsequent to contact of the latter with the web and prior to contact of the blanket cylinder with the printing cylinder in a reverse direction of running of the unit.

Typical embodiments of the invention are described, by way of example only, with reference to the accompanying schematic drawings wherein:

Figure 1 and 2 illustrates a simple reversible rotary web offset single colour printing unit in its alternative running conditions.

Figure 3 illustrates a unit of the type shown in Figure 2 used in series with a known four colour printing unit.

Figures 4 and 5 illustrate a perfecting type of reversible web offset printing unit according to the invention, and

Figure 6 illustrates a series combination of each of the units shown in Figures 1 to 5.

Referring initially to Figure 1 and 2 the printing unit comprises a printing cylinder 10, a blanket or offset cylinder 11 directly engaging the printing cylinder and an impression cylinder 12, with the latter indirectly engaged with the blanket cylinder through a web 13. The cylinders are driven in synchronism in known manner but according to this invention this drive is reversible. A plurality of inking rollers 14 engage with the printing cylinder 10, and a damping roller assembly 15 has a terminal roller 16 which, during normal running of the printing unit as shown in Figure 1, has engagement with the printing cylinder so that any point on the surface of the printing cylinder 10, after engagement with the blanket cylinder 11, engages firstly with the terminal damping roller 16 and then with the inking

rollers 14. Hence, any part of the printing cylinder surface will receive damping solution from the damping roller, then ink from the inking roller prior to transfer of the ink image first to the blanket cylinder and then to the web passing through the nip between the blanket cylinder and the impression cylinder.

The damping roller assembly 15 is mounted so as to be pivotable between alternative engagement of the terminal damping roller 16 with the cylinder as shown in Figure 1, and also with the blanket cylinder 11 between the angularly spaced zones of contact of the latter firstly with the web and secondly with the printing cylinder, the latter mode of engagement being adopted when the rotational directions of the three cylinders are reversed as shown in Figure 2. In the latter case since the terminal damping roller 16 engages the blanket cylinder 11 on the output side of the blanket cylinder-impression cylinder nip, the cleaned blanket cylinder will receive damping solution from the damping roller assembly 15 and will then transfer the solution to the printing cylinder 10 prior to receiving the ink from the inking rollers 14. Thus the ink image is transferred to the blanket cylinder and then to the web in the normal manner despite the reversed running of the cylinders and without smearing due to contamination of the damping rollers by ink.

One example of the utilisation of the above described reversible printing unit is for printing on one side of a web in one colour and on the reverse side of the web in four colours as illustrated in Figure 3. To print in four colours on one web side, the web is passed via guide rollers 22 through a multi-colour printing unit 17, such as the disclosed in British Patent Specification No. 872849, after the reversible printing unit 18 has printed in a single colour on the reverse side 13 of the web 19. To print in this manner the web must, for practical reasons, pass through one printing unit in the reverse of the normal direction, which is accomplished by the reverse running of the single colour printing unit 18 with its terminal damping roller 20 in direct engagement with the blanket cylinder 21.

As illustrated in Figures 4 and 5, the invention is also applicable to so called "perfecting" printing units which simultaneously print a single colour on each side of a web. In this unit, an independent impression cylinder is omitted and a nip is provided between a pair of blanket cylinders 30, 31 each associated with a respective printing cylinder 32 and 33 and respective damping and inking rollers 34, 35 and 36, 37. Each blanket cylinder 30, 31 serves as an impression cylinder for the blanket cylinder printing on the opposite side of the web 38. Such a unit is made reversible by mounting both damping rollers 34 and 35 so that they are movable from engagement with their respective printing cylinders 32 and 33

as shown in Figure 4 to engagement with their respective blanket cylinders 30, 31 as shown in Figure 5.

In the further example of the use of the invention shown in Figure 6 a printing press comprises three printing units, namely a multi-colour unit 40, a perfecting unit 41, and a simple reversible unit 42. The following variations in printing can for example be obtained with such a press.

1. A web 43 passing from the reel stand 44 only through the reversible unit 42 will be printed in one colour on one side only according to the direction of running of the unit

2. A web 45 passing from the reel stand 46 only through the perfecting unit 41 will be printed in one colour on each side.

3. A web 47 passing through both the perfecting unit 41 and the reversible unit 42 will be printed in one colour on a first side and two colours on the second side with the unit 42 operating normally, and

4. A web 48 passing from reel stand 44 through both the multi-colour unit 40 and the reversible unit 42, with the latter operating in reverse, will be printed in four colours on one side and in only one colour on the other side.

The construction of a suitable mounting for the damping rollers to permit their alternative engagement with the printing cylinder and the blanket cylinder is within the skill of persons versed in the art of printing machine manufacture and is accordingly not described in detail, but it is envisaged that the mounting can for example comprise a swinging frame controlled by adjusting screws or fluid powered piston and cylinder units.

While the above described embodiments of the invention all employ damping and inking rollers it is to be appreciated that alternative damping and inking systems can be substituted for these rollers provided that their sequence of application of damping solution and ink to the printing and blanket cylinders is as taught above.

WHAT WE CLAIM IS:—

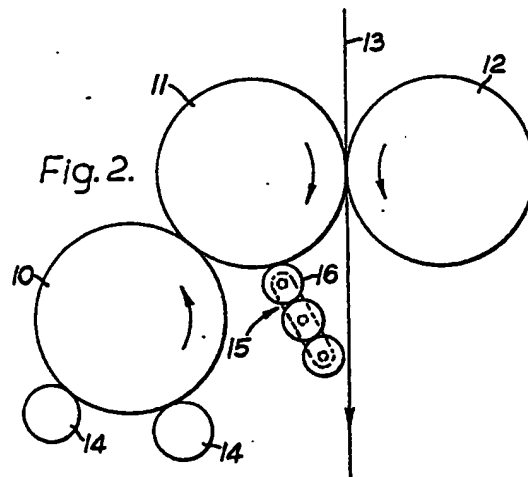
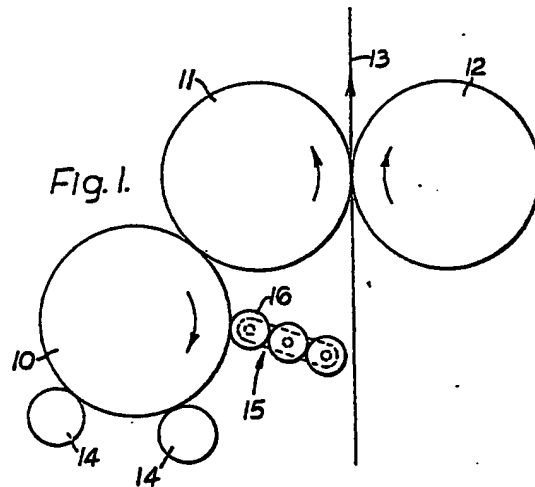
1. A reversible rotary web offset printing unit comprising a printing cylinder, a blanket cylinder having direct peripheral engagement with the printing cylinder, inking means for applying ink to the printing cylinder, and damping means operative to apply damping solution to the printing cylinder prior to the application of ink characterised in that the damping means is movable between a first position of direct engagement with the printing cylinder in a first direction of running of the cylinders and a second position of engagement with a zone of the blanket cylinder subsequent to contact of the latter with the web and prior to contact of the blanket cylinder with the printing cylinder in a reverse direction of running of the unit.

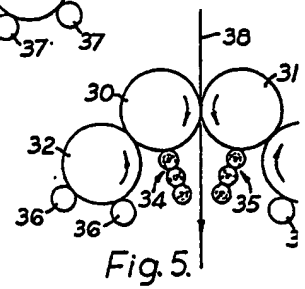
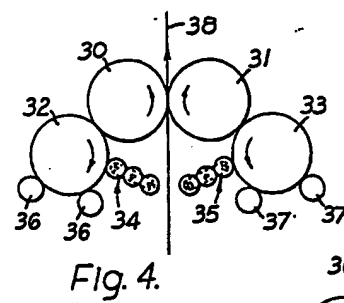
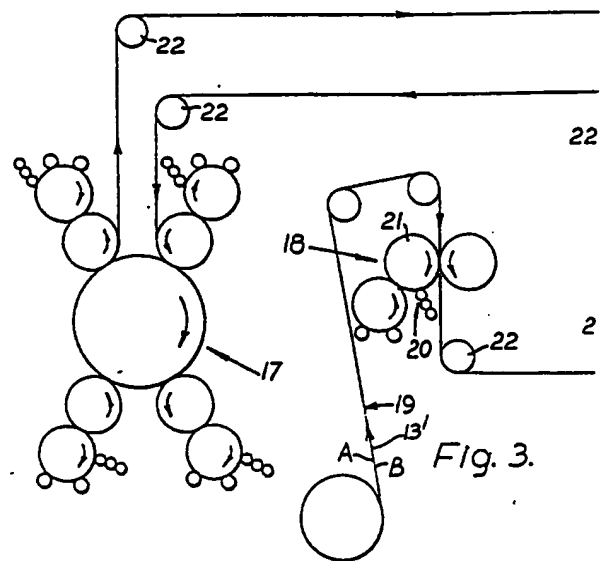
2. A printing unit according to Claim 1 characterised in that the damping means com-

- prises a roller which is alternatively engageable with the printing cylinder and the blanket cylinder.
- 5 3. A printing unit according to Claim 1 or 2 comprising two blanket cylinders and respective printing cylinders wherein the blanket cylinders establish a printing nip therebetween and are both engageable by respective movable damping means.
- 10 4. A printing unit according to Claim 1 or 2 in series connection with a multicolour printing unit.
5. A printing unit according to Claim 1 or 2 in series connection with a printing unit according to Claim 3. 15
6. A printing unit according to Claim 1 or 2 in series connection with a printing unit according to Claim 3 and a multicolour printing unit.
7. A reversible rotary web offset printing unit substantially as described and illustrated in the accompanying drawings. 20

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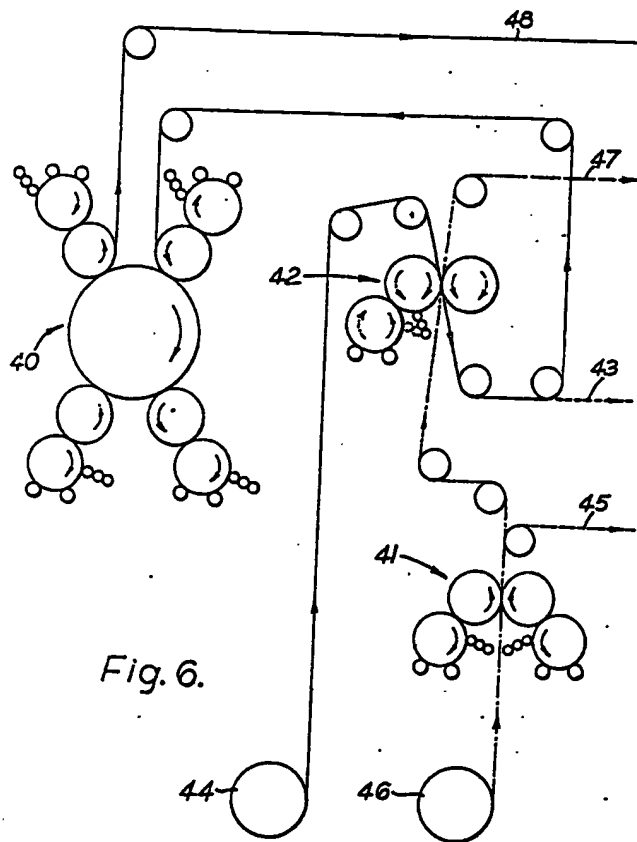


Fig. 6.

